this patent include polyacrylic acid having a molecular weight in the range of 2,000 to 4,000,000; sodium polystyrenesulfonate having a molecular weight in the range of about 5,000 to 6,000,000; "GANTREZ AN", available from GAF corporation; polyvinyl phosphate; and copolymers of acrylates which contain pendent carboxyl groups.

U.S. Pat. No. 4,375,461, issued Mar. 1, 1983, to Gander et al., discloses compositions and methods for preventing the attachment of dental plaque to the surfaces of the teeth of mammals. These disclosed compositions and methods comprise certain sulfonated vinylaromatic homopolymers and copolymers and the pharmaceutically acceptable salts thereof in a pharmaceutically acceptable vehicle, and a periodic application thereof to teeth. Hydrophilic polymeric anionic sulfates useful for dental plaque control in accordance with the disclosure of this patent are essentially sulfonated homopolymers of both unsubstituted and substituted styrene, 1-vinylnaphthalene, 2-vinylnaphthalene, and acenaphthylene, and certain copolymers thereof. Representative examples of vinyl aromatic monomers, homopolymers, and copolymers which are available in commerce and can be converted to the hydrophilic polymeric sulfonates of this patent are the following: (a) polystyrene and sodium polystyrene sulfonate of varying molecular weights available from Pressure Chemical Company; (b) styrene/butadiene (85/15) copolymer; (c) styrene/isobutylene (60/40) copolymer; (d) vinylbenzyl chloride monomer, 60/40 meta-/paraisomers, available from Dow Chemical Company; and (e) halostyrene monomers available from Polysciences Inc., and Aldrich Chemical Company.

U.S. Pat. No. 4,362,713, issued Dec. 7, 1982, to Buck, discloses compositions and methods for preventing the attachment of dental plaque to the teeth of mammals. The disclosed compositions and methods comprise certain salts of certain maleic acid copolymers in a pharmaceutically acceptable vehicle and the periodic application thereof to teeth. This patent further discloses that certain hydrophilic alkali metal and ammonium salts of 1:1 copolymers of styrene and maleic acid and 1:1 copolymers of certain linear 1-alkenes and maleic acid have been found to inhibit the deposition of dental plaque onto human teeth when applied thereon.

U.S. Pat. No. 4,224,309, issued Sept. 23, 1980, to Gaffar et al., discloses an oral composition containing an antibacterial antiplaque agent and an anti-stain additive which reduces staining caused by the antibacterial antiplaque agent, without substantially diminishing the activity of the antibacterial antiplaque agent. Bisbiguanido hexanes, such as chlorhexidine and alexidene, and quaternary ammonium salts, such as benzethonium chloride and cetyl pyridium chloride, are typical examples of antibacterial agents. The anti-stain additive is 2-phosphonobutane-1,2,4-tricarboxylic acid or an orally acceptable salt thereof.

U.S. Pat. No. 4,138,477, issued Feb. 6, 1979, to Gaffar, discloses a composition which is useful for the prevention and control of mouth odor and is also effective in preventing calculus, plaque, caries and periodontal disease. This composition contains, as its essential agent, a zinc-polymer combination formed by the reaction or interaction of a zinc compound with an anionic polymer containing carboxylic, sulfonic and/or phosphonic acid radicals.

U.S. Pat. No. 4,118,474, issued Oct. 3, 1978, to Gaffar et al., discloses an antibacterial oral composition effective at promoting oral hygiene which contains an antibacterial antiplaque agent and an additive for reducing staining of dental surfaces without substantially diminishing the activity of the antibacterial and antiplaque agent. Bisbiguanido hexanes, such as chlorhexidine and alexidine, and quaternary ammonium salts, such as benzethonium chloride and cetyl pyridinium chloride, are typical examples of antibacterial antiplaque agents. The anti-stain additive is phosphonoacetic acid or salts thereof.

U.S. Pat. No. 4,118,473, issued Oct. 3, 1978, to Gaffar et al., discloses an antibacterial oral composition effective to promote oral hygiene which contains an antibacterial antiplaque agent and an additive for reducing staining of dental surfaces without substantially diminishing the activity of the antibacterial and antiplaque agent. Bis-biguanido hexanes, such as chlorhexidine and alexidine, and quaternary ammonium salts, such as benzethonium chloride and cetyl pyridinium chloride, are typical examples of antibacterial antiplaque agents. The antistain additive is an N-methylene phosphonate compound, such as iminodiacetic N-methylene phosphonic acid and salts thereof.

United Kingdom Patent Application 2151478-A, published July 24, 1985, assigned to the Colgate-Palmolive Company, discloses that dental plaque and gingivitis are inhibited by the regular application to the oral cavity of an oral composition containing an effective plaque- and gingivitis-inhibiting amount of polyvinyl phosphonic acid or a salt thereof. The polyvinyl phosphonic acid, and salt thereof, have a preferred number average molecular weight of from about 6,000 to 100,000.

CALCULUS: Numerous compositions and methods for inhibiting the formation of calculus are reported in the literature.

U.S. Pat. No. 4,885,155, to Parran and Sakkab, granted Dec. 5, 1989, relates to oral compositions containing pyrophosphate salts which provide an anticalculus benefit.

British Patent No. 490,384, Feb. 15, 1937, discloses oral compositions containing ethylenediaminetetraacetic acid, nitrilotriacetic acid and related compounds as anticalculus agents.

U.S. Pat. No. 3,678,154, July 18, 1972 to Widder, et al. discloses oral compositions containing certain polyphosphonates and fluoride. U.S. Pat. No. 3,737,533, June 5, 1973 to Francis discloses oral compositions containing certain carbonyl diphosphonates.

In addition to the above references, the prior art discloses dentifrices and mouthwashes containing soluble pyrophosphate salts which have been indicated for a variety of purposes. Included among such references are U.S. Pat. No. 2,941,926, June 21, 1960 to Salzmann, et al. which discloses dental powders containing chlorophyll and pyrophosphate salts. U.S. Pat. No. 3,137,632, June 16, 1964 to Schiraldi discloses toothpastes containing pyrophosphate salts. U.S. Pat. Nos. 3,927,201 and 3,927,202, Dec. 16, 1975 to Baines, et al. and Harvey, et al., respectively, disclose toothpastes which utilize soluble pyrophosphates as abrasives. U.S. Pat. No. 4,244,931, Jan. 13, 1981 and 4,247,5226, Jan. 27, 1981 to Jarvis, et al. disclose pyrophosphate salts in dicalcium phosphate systems. Japanese Patent Application Disclosure No. 4945-1974 discloses soluble pyrophosphates in a variety of dentifrice systems. U.S. Pat. No. 4,333,551, Apr. 6, 1982 to Parran discloses tetraalkali metal salts in mouthwash compositions. Draus, Lesniewski and Miklos, Pyrophosphate and Hexametaphosphate Effects in